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Risk Management Concerns for Spring Crops

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Producers made their crop insurance decisions during March and are now looking for other ways to manage the remaining risk associated with this year's crop. Attendees at Master Business Manager workshops this past winter routinely identified production risk, that is, not receiving their expected yield as their primary concern. However, now that the growing season is underway, price risk moves to the forefront. This article looks at the nature of price and yield risk in South Dakota and identifies concerns of which producers should be aware as they make their price risk management decisions.

Nature of yield and price risk in South Dakota

Yield risk is a warranted concern in South Dakota which, for agronomic reasons, has a lower average yield over time for corn than other corn-belt states. At the same time, the variability per unit of yield is high relative to much of the corn-belt[1]. Thus, the impact of yield risk is relatively high in South Dakota. Producers shocked by the high cost of insurance should be conscious of the fact that insurance may also pay indemnities more often than similar coverage in other states.

The relation between yield risk and price risk is of special concern for South Dakota and other states on the fringes of the corn belt. For many corn-belt states, if yields are low in a given year the price received is often higher as their production levels influence U.S. supply and price to a greater extent than fringe states. For such states, a natural hedge exists and some price risk is mitigated. The situation is different in South Dakota where corn, soybeans, and winter wheat yields have a low correlation with U.S. prices[2]. Thus, South Dakota producers are more susceptible to the risk of low yields and low prices relative to other states. At the same time, high prices could come regardless of South Dakota's yields and potentially when there is little to sell elsewhere.

Managing yield risk

Yield risk is large in terms of its impact on profit and is usually not in the control of producers. Hence, crop insurance is the primary tool as it transfers losses to the insurance company in exchange for a premium. There are a variety of crop insurance programs and policies, but this article focuses on the most common programs utilized for corn, soybean, and wheat acres in South Dakota.

Catastrophic Risk Protection (CAT) is minimal coverage available for a low per-crop fee. Producers willing and able to self-insure against smaller yield losses use CAT. Multi-Peril Crop Insurance (MPCI) is the most common form of yield insurance, covering a larger percentage of historic yields. Crop Revenue Coverage (CRC) is one form of revenue insurance with higher coverage on price and yield relative to MPCI. For details concerning these programs, contact a local crop insurance agent.

The purchasing pattern of crop insurance in 1999 reveals the extent of insurance coverage in South Dakota for the principal crops. Shown in Table 1, producers covered 3.5 million corn acres with insurance, compared to 3.65 million planted acres. For soybeans, they covered 3.7 million acres compared to 3.9 million planted acres. For wheat, 3.6 million acres were covered compared to 3.3 million planted acres. Wheat acreage and insured acres may not agree because planted acres are estimated instead of actual numbers. Producers extensively used both MPCI and CRC and received substantial indemnity payments in a reasonable crop year.

Table 1. Insurance Coverage Statistics for South Dakota in 1999

S.D. Crop	Policies Sold	Acres Covered	Coverage ($)	Premiums Paid ($)	Indemnities Received ($)
Corn – APH	20,120	2,438,395	247,128,572	23,820,880	21,174,151
Corn – CRC	6,066	1,049,812	152,570,490	17,925,245	21,320,653
Soybeans – APH	16,416	2,354,216	244,246,442	17,848,747	13,051,228
Soybeans – CRC	7,364	1,380,906	153,492,357	13,827,465	10,386,092
Wheat – APH	15,748	2,190,213	116,049,405	15,363,810	10,824,997
Wheat – CRC	3,011	473,877	35,764,952	5,077,328	7,597,662

Source: USDA-RMA "Summary of Business Reports as of 6/12/00" available at www.rma.usda.gov.
Note: APH policies and coverage includes both MPCI and CAT.

Queries of producers revealed a variety of reasons for choosing among the various insurance products and coverage levels. The price of different products was an obvious driving factor determining the specific coverage chosen by producers, but producers also cited tradition and having different insurance needs. Tradition means that producers select the same things they chose in earlier years. This approach is sound if they made a good initial choice or if the coverage has been working well. Complacency could result in your insurance not adequately covering risks, especially if the operation has changed in recent years. Because the needs of each producer are different, an individual cannot simply do what a neighbor does. Younger, more leveraged producers spoke of needing higher levels of insurance because they cannot afford to be without it. Older producers with enough equity are more able to self-insure and can purchase less coverage.

The price differential, in terms of the coverage percentage, can make one product more cost-effective than another product. For example, producers said that in 1999 the small difference between the Actual Production History (APH) price (applicable for CAT and MPCI) and the CRC price for soybeans made CRC look expensive relative to MPCI. Conversely, with the price spread for corn being wider, CRC looked like a better deal. In 2000, a similar pattern is evident, as shown in Table 2. There is a wide spread between the APH and CRC prices for corn, but not for soybeans or wheat.

Policy sales data collected for the year 2000 supports the anecdotal evidence pointing toward a preference for CRC coverage on corn. While in 1999 only 23% of the insurance policies for corn were CRC in South Dakota (see Table 1), in 2000 about 35% of the policies sold were for CRC coverage. CRC usage on soybeans is also on the rise in 2000, where 37% of the policies were for CRC coverage versus 31% during 1999. MPCI and CAT coverage continues to dominate wheat, as 82% of policies during 2000 reflect those types of coverage. Across all crops for 2000, producers have "bought up" coverage (over CAT) on 88% of policies versus 86% during 1999. The popularity of CRC and all buy-up coverage reflects the desire of producers to offset yield risk, and it means they are also conscious of revenue risk.

Table 2. Selected Prices for Insurance Products and Loan Rates

Crop	APH Price ($/bu)	CRC Price ($/bu)	2000 Loan Rates ($/bu)
Corn	1.90	2.51	1.72 - 1.90
Soybeans	5.16	5.32	4.68 - 5.11
Wheat	3.15	3.46	2.28 - 2.68

Sources: The APH and CRC prices are from USDA-RMA. The loan rates are from USDA-FSA.
Notes: Wheat APH and CRC prices reflect hard red spring wheat. The loan rates are the range of low to high across all counties in South Dakota.

Managing price risk

The government loan program is a commonly used risk management tool during times of low prices. The loan rate is a form of price insurance. While yield insurance only pays an indemnity when a substantial yield loss occurs, the loan rate program only pays when the market price falls below the loan rate. However, the loan rate only applies to bushels actually produced. This subtle difference can have a substantial impact on downside price protection. The ranges of 2000 loan rates for South Dakota are shown in Table 2. Loan deficiency payments (LDPs) are often compared to put options. However, with put

options the producer chooses the coverage level by choosing the hedge ratio. With LDPs it is as though the put options disappear on any lost yield. With low yields and low prices, put options could provide better protection than LDPs, regardless of their higher cost.

Price risk is prevalent regardless of yield risk, but crop insurance products can influence price risk management. For example, CAT coverage is widely utilized in South Dakota and is inexpensive relative to the amount of coverage it provides. However, CAT coverage can work against an aggressive marketer. An equity threatening case is found when CAT is the only insurance, the expected production is fully hedged with a futures or forward contract, and a yield disaster and high U.S. prices result. In such a scenario, CAT would likely only cover a small portion of the economic cost of planting the crop plus there would be hedging losses due to rising prices. However, such dangers from over-hedging can be mitigated by purchasing out-of-the-money call options.

MPCI allows a doubling of coverage relative to CAT for a small, subsidized premium. Currently, futures prices less harvest-time expected basis levels give an implied forward price that is fairly close to the APH price for corn. This implies that producers with MPCI coverage could hedge a larger portion of their expected crop, relative to CAT coverage, and not have to worry about major losses. MPCI coverage does not protect against any price risk. Because of the low correlation between U.S. price and South Dakota yield, it seems reasonable to expect that price risk would be as large of a concern as yield risk. Yields low enough to trigger indemnity payments, especially when the more typical lower election levels are chosen, are not likely to occur.

While not perfect, CRC is useful because it is revenue insurance. CRC behaves like MPCI for yield coverage, but also like a long option straddle. If prices move low enough or high enough (if yields are low enough), CRC may pay an indemnity. Unfortunately, CRC is still only triggered in the event of a substantial yield loss. Producers should make sure they understand what the worst case scenario with insurance looks like. Especially in corn this year, the loan rate is substantially less than the CRC price. Thus, in the event of a complete yield loss, the CRC revenue protection is greater than the revenue that would occur with a yield at the trigger level. The situation is less pronounced in soybeans and wheat. However, the specifics will depend on farm and county specific characteristics and assumptions.

Summary

Both yield risk and price risk are prevalent in South Dakota and complicate the risk management plans of producers. Crop insurance is the primary method of managing yield risk, and revenue products have become increasingly popular in South Dakota. The loan rate provides price protection, but only on the bushels produced. Overhedging is a potentially risk-increasing venture unless adequate crop insurance is in place. Finally, while CRC sounds like a lot of coverage, the worst-case scenario is likely to be at trigger yield levels.

References:

Harwood, Joy, Richard Heifner, Keith Coble, Janet Perry, and Agapi Somwaru. *Managing Risk in Farming: Concepts, Research, and Analysis.* Washington, DC: Economic Research Service, United States Department of Agriculture. Agricultural Economic Report No. 774 (March 1999).

Schnepf, Randy, Richard Heifner, and Robert Dismukes. "Insurance and Hedging: Two Ingredients for a Risk Management Recipe." *Agricultural Outlook* (April 1999): 27-33.

[1] For a more in-depth discussion see Harwood, et al. (1999).
[2] Nationwide maps of yield and price correlation are shown in Schnepf, Heifner, and Dismukes (1999).

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